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Yoon et al.(54) **FOREIGN SUBSTANCE PREVENTION UNIT
TO PROTECT ELECTRO-PHOTOGRAPHIC
PRINTER FROM FOREIGN SUBSTANCES**(30) **Foreign Application Priority Data**

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Jung, Yongin-si (KR)****Publication Classification**(51) **Int. Cl.7** **G03G 21/10**(52) **U.S. Cl.** **399/358**(57) **ABSTRACT**

A foreign substance prevention unit use with an electro-photographic printer is installed over a waste toner injection hole such that it closes the waste toner injection hole when a photosensitive medium is separated from a main body of the electro-photographic printer, and opens the waste toner injection hole when the photosensitive medium is installed in the main body of the electro-photographic printer. The foreign substance prevention unit is formed of an elastic material.

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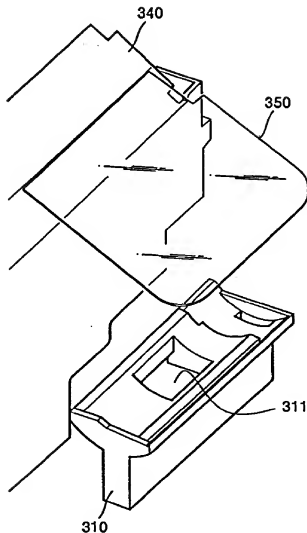
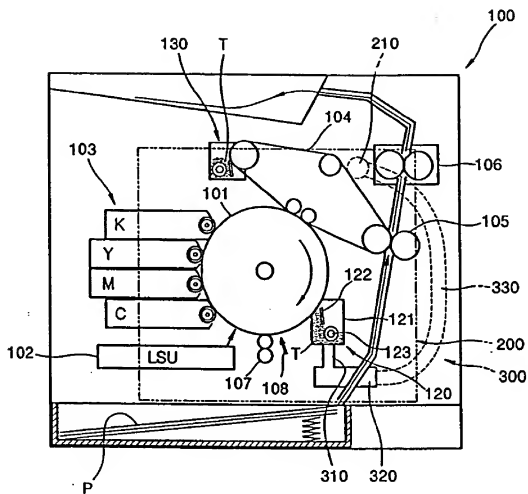
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FIG. 3



latent electrostatic image on the outer circumferential surface of the photosensitive drum 101.

[0036] When the latent electrostatic image approaches the developer 103C due to a rotation of the photosensitive drum 101, the cyan-colored toner contained in the developer 103C can be attached to the latent electrostatic image, thereby forming the cyan-colored toner image. When the cyan-colored toner image approaches the transfer belt 104 due to the rotation of the photosensitive drum 101, the cyan-colored toner image can be transferred onto the transfer belt 104 due to the electrical potential difference between the photosensitive drum 101 and the transfer belt 104 and/or a contact pressure therebetween. When the cyan-colored toner image is completely transferred onto the transfer belt 104, the magenta-, yellow-, and black-colored toner images can sequentially be formed and then sequentially transferred onto the transfer belt 104 so that the cyan-, magenta-, yellow-, and black-colored toner images can overlap one another on the transfer belt 104. The overlapping cyan-, magenta-, yellow-, and black-colored toner images on the transfer belt 104 can form the color toner image. When the printing medium P passes between the transfer belt 104 and the transfer roller 105, the color toner image can be transferred onto the recording medium P. Thereafter, the fixing unit 106 can fix the color toner image onto the printing medium P by applying heat and pressure and then discharges the resulting printing medium P, thus completing an entire process of forming a color image on the recording medium P.

[0037] The cyan-, magenta-, yellow-, and black-colored toner images can temporarily be contained in the photosensitive drum 101 and then in the transfer belt 104. In a process of transferring the cyan-, magenta-, yellow-, and black-colored toner images from the photosensitive drum 101 to the transfer belt 104 or from the transfer belt 104 to the printing medium P, some toner particles may remain on the photosensitive drum 101 or the transfer belt 104.

[0038] Referring to FIG. 3, the electro-photographic printer 100 can include cleaning units 120 and 130 which remove a waste toner from the photosensitive drum 101 and the transfer belt 104, respectively, and a waste toner transfer unit 300 which transfers the waste toner removed from the photosensitive drum 101 and the transfer belt 104 by the cleaning units 120 and 130, respectively, and a container 200 which stores the waste toner transferred by the waste toner transfer unit 300.

[0039] The cleaning unit 120 can include a housing 121, a blade 122 which contacts the photosensitive drum 101 and scrapes the waste toner off the photosensitive drum 101, and a transfer unit 123 which transfers the waste toner to a discharger 123 disposed at one end of the housing 121. The cleaning unit 130 may have the same structure as the cleaning unit 120. A reference character T denotes the waste toner collected in to the cleaning unit.

[0040] An injection hole 210 can be formed on a top surface of the container 200 so that the container can efficiently accept and contain the waste toner. In this embodiment, the transfer belt 104 can be located above the photosensitive drum 101, and thus, the waste toner removed from the transfer belt 104 by the cleaning unit 130 can be directly injected into the container 200 from the cleaning unit 130 via an injection hole (not shown).

[0041] The waste toner removed from the photosensitive drum 101 by the cleaning unit 120, unlike the waste toner removed from the transfer belt 104 by the cleaning unit 130, can be transferred from the cleaning unit 120 to the container 200 by the waste toner transfer unit 300 rather than being directly injected into the container 200, because there is a difference between a height of the injection hole of the container 200 and a height of the cleaning unit 120.

[0042] The waste toner transfer unit 300 can include a duct and a transfer screw. The duct can comprise first through third sub-ducts 310, 320, and 330. The first sub-duct 310 connects the cleaning unit 120 to the second sub-duct 320. A waste toner injection hole 311 of FIG. 4, through which the waste toner removed from the photosensitive drum 101 by the cleaning unit 120 is discharged, can be formed on a top of the first sub-duct 310. The third sub-duct 330 can be formed as a circular pipe which can be easily bent to connect the second sub-duct 320 and the container 200. The transfer screw can be installed in the duct and transfers the waste toner injected into the duct via the waste toner injection hole 311 to the container 200.

[0043] Referring to FIGS. 4 through 7, a foreign substance prevention unit 350, which prevents foreign substances from going into the waste toner transfer unit 300 via the waste toner injection hole 311, can be disposed over the waste toner injection hole 311.

[0044] One end of the foreign substance prevention unit 350 can be fixed to a bracket 340 installed in the main body of the electro-photographic printer 100, and the other end of the foreign substance prevention unit 350 can be located over the waste toner injection hole 311.

[0045] The foreign substance prevention unit 350 can be, but not necessarily, formed of a flexible and elastic material, for example, plastic, because the foreign substance prevention unit 350 should not be an obstacle to installation/separation of the photosensitive drum 101 into/from the main body of the electro-photographic printer 100.

[0046] As shown in FIGS. 4 and 5, when the photosensitive drum 101 is separated from the main body of the electro-photographic printer 100, the foreign substance prevention unit 350 can cover the waste toner injection hole 311 so that the foreign substances from an outside of the electro-photographic printer 100 can be prevented from going into the waste toner transfer unit 300 via the waste toner injection hole 311.

[0047] As shown in FIGS. 6 and 7, when the photosensitive drum 101 is installed in the main body of the electro-photographic printer 100, the foreign substance prevention unit 350 can contact the photosensitive drum 101 and then is bent and folded due to a contact force therebetween such that it does not serve as an obstacle to connection of the cleaning unit 120 to the waste toner injection hole 311.

[0048] Thereafter, when the photosensitive drum 101 is separated from the main body of the electro-photographic printer 100, the foreign substance prevention unit 350 can return to its original state illustrated in FIG. 4 or 5 due to its elasticity.

[0049] As described above, a foreign substance prevention unit of an electro-photographic printer according to the present general inventive concept can prevent foreign sub-